

Rhodora

JOURNAL OF THE
NEW ENGLAND BOTANICAL CLUB

Conducted and published for the Club, by

MERRITT LYNDON FERNALD, Editor-in-Chief

CHARLES ALFRED WEATHERBY } Associate Editors
ALBERT FREDERICK HILL }
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THE FLORA OF PENIKESE, SEVENTY-FOUR YEARS AFTER

III. PENIKESE ISLAND FUNGI¹

ELIZABETH R. DEARDEN²

The island of Penikese is dominated largely by an open, wind-swept, and arid grassland. To obtain a representative list of the fungous flora, several areas on the island were selected for intensive survey. These were chosen to include the habitats most nearly optimum for fungal growth, and the widest selection of possible hosts and other substrata. The results of such a localized study are likely to be more profitable than a cursory examination of the whole island necessarily limited by the time available.

A large proportion of the collections were obtained from the area encompassing Typha Pond, a shallow freshwater pond. Several *Pyrenomycetes* and resupinate *Thelephoraceae* were found on the rotted wood of decorticated willow stumps. These stumps were the only trace of willows reported around the pond by Shaw in the previous survey. The branches and dead twigs of the maple trees growing on the slopes behind the caretaker's cottage, the undersurface of fallen logs in moist areas, and the flora growing in the vicinity of the beach and pond were among the best substrates. Few fungi were collected on the herbaceous

¹ The third paper reporting results of the biological survey of Penikese Island in commemoration of the 75th anniversary of the founding of Louis Agassiz' Natural History school there in 1872.

² Department of Botany, University of Toronto, Toronto, Canada.

hosts growing in very dry soil. The fungi reported from soil and on dung, and the majority of the myxothallophytes listed were collected and subsequently determined by Dr. J. T. Bonner.

The fungi collected have been deposited in the Mycological Herbarium of the University of Toronto. Most of these collections are meager; few fungi are represented from more than one locality on the island. These factors indicated the season not to be at an optimum for fungal growth.

Thirty-five genera of fungi and five genera of other simple, non-pigmented thallophytes are reported for this survey. Thirty genera of fungi and all of the myxothallophytes are newly reported for Penikese. The apparent discrepancy between the present list and that compiled for the previous survey is not surprising. Both lists are admittedly incomplete, but offer some indication of the fungous vegetation to be found on the island.

To all of those who have been of assistance in the collection and determination of these fungi, particularly Dr. John T. Bonner, Mr. Zelman Z. Dworkin, Dr. Roy F. Cain, and Mr. Wm. Irwin Illman, are extended sincere thanks in acknowledgment and appreciation of their aid.

MYXOBACTERIALES

Myxococcus sp. On (?) Muskrat dung.

ACRASIALES

Dictyostelium mucoroides Bref. From soil and mud, and at edge of Typha-Pond in cattails.

LABYRINTHULALES

Labyrinthula macrocystis Cienk. On *Zostera marina* L., widespread, causal organism of epiphytotic in eel-grass.

MYXOGASTRALES

Arcyria nutans (Bull.) Grev. On log by side of house.

Dictydium cancellatum (Batsch) Machr. On log by edge of Typha Pond.

F U N G I

PHYCOMYCETES

Albugo candida (Pers. ex Lév.) O. Kuntze. On *Sisymbrium officinale* (L.) Scop. growing in the damp bottom of reservoir no. 2.

Mucor sp. From soil, widespread.

PILOBOLUS sp. On (?) Muskrat dung.

RHIZOPUS sp. From soil, widespread.

ASCOMYCETES

AMPHISPHAERIA AQUATICA E. and E. On the inner rotted heartwood of *Salix* stump by Typha Pond.

HYSTEROGRAPHIUM MORI (Schw.) Rehm. On *Salix* stump by Typha Pond,

HYSTEROGRAPHIUM sp. On (?) *Catalpa* twigs. This specimen is similar to the one listed above, but has larger spores ($23 \times 10 \mu$) with lighter colored walls.

MYCOSPHAERELLA sp. On the overwintered leaves of *Panicum virgatum* L. An undetermined species of *Hendersonia* was present on the leaves of the same plant.

NITSCHKIA FUECKELII Nits. On dead twigs of *Acer*.

ORBILIA CURVATISPOREA Bourd. On frondose wood by shack and at Typha Pond.

ORBILIA sp. Too young for specific determination.

ROSELLINIA SUBICULATA (Schw.) Sacc. On *Salix* stump by Typha Pond.

BASIDIOMYCETES

CONIPHORA OLIVASCENS (B. & C.) Mass. On undersurface of fallen log.

CORTICIUM CONFLUENS Fr. On stump by Typha Pond.

ODONTIA SPATHULATA (Fr.) Litsch. On frondose log by shack.

PELLICULARIA PRUINATA (Bres.) Rogers ex Linder. On wood.

PENIOPHORA CINEREA (Pers. ex Fr.) Cooke complex. On *Acer* twigs.

PENIOPHORA SAMBUCCI (Pers.) Burt. On *Salix* stump by Typha Pond.

PENIOPHORA TENUIS (Pat.) Masee. From fence pole on hillside.

POLYPORUS sp. On frondose wood, too old for determination.

PORIA sp. (brown) or resupinate FOMES sp. On undersurface of log by shack.

PORIA sp. (white). On frondose wood next to shack.

PSALLIOTA ARVENSIS (?). In grass.

PUCCINIA CORONATA Corda or *P. rubigo-vera agropyri* (Eriks.) Arth. II on *Holcus lanatus*.

STEREUM FASCIATUM Schw. On frondose log by shed.

FUNGI IMPERFECTI

ASPERGILLUS CANDIDUS Link. On animal cartilage, probably porpoise.

ASPERGILLUS sp. In soil, widespread.

CEPHALOSPORIUM sp. On log next shack.

FUSARIUM sp. In soil, widespread.

HENDERSONIA sp. On leaves of *Panicum virgatum* L. A species of *Mycosphaerella* was also on this plant.

HYPOXYLON RUBIGINOSUM Fr., imperfect stage. On log of frondose wood next to shack.

OIDIUM CANDICANS (Sacc.) Linder. Imperfect stage of *Pellicularia pruinata* (Bres.) Rogers ex Linder. On the log next shack.

PENICILLIUM sp. In soil, widespread.

STEGANOSPORIUM PIRIFORME (Hoffm.) Corda. On *Acer*.

TRICHODERMA LIGNORUM (Tode) Harz. On decorticated *Salix* stump by Typha-Pond.

TUBERCULARIA sp. The imperfect stage of *Nectria cinnabarina* (Tode ex Fr.) Fr. On dead twigs of *Acer*.

TUBERCULARIA. *Periola* complex. On *Plantago lanceolata*.

IV. FLORA OF PENIKESE ISLAND

EDWIN T. MOUL

The third survey of the land flora of Penikese Island was made during the summer of 1947, commemorating the 74th Anniversary of the founding of the Anderson School of Natural History by Louis Agassiz. This survey was made by a group from the Botany Department of the Marine Biological Laboratory. Those participating were Gladys Bulmer, Dorothy Stewart, Hazel L. Moul, David Erskine, E. M. Hulburt and Edwin T. Moul. It was our task to cover the Lichens, Bryophytes, Pteridophytes and Spermatophytes. A total of three trips was made to the island, the first on July 6, another on July 31 and a final trip on August 3. This enabled us to secure the forms that mature early in the summer as well as collect the late summer plants.

Specimens were collected of all species observed and are to be distributed to the following Herbaria. The first set of plants will be deposited in the Woods Hole Herbarium, the second set sent to the University of California at Berkeley, the third set to the University of Pennsylvania and further duplicates to Pennsylvania State College. A complete set of grasses has been placed at Iowa State College and a set of the lichens deposited in the herbarium of the University of Wisconsin. All determinations not otherwise credited were made by David Erskine and

Edwin T. Moul. Acknowledgment is given here to Dr. John Thomson, Jr., University of Wisconsin; Dr. Richard W. Pohl, Iowa State College; Dr. E. T. Wherry, University of Pennsylvania; Dr. Herbert A. Wahl, Pennsylvania State College; Dr. F. W. Pennell of the Academy of Natural Sciences of Philadelphia and Mr. Truman Yuncker for making and verifying determinations in specific groups. The assistance of Mr. Robert L. Schaeffer, Jr., of the University of Pennsylvania in checking synonymy is gratefully acknowledged.

The first survey of the Flora of Penikese Island was made by David Starr Jordan under the direction of Louis Agassiz in 1873. The results were published in the *American Naturalist*, volume 8, April, 1874. A second survey was made on the 50th anniversary of the opening of the "Agassiz Laboratory" in 1923 and the results published in *RHODORA*, volume 26, beginning with the October issue, 1924. Dr. John M. Fogg, Jr., made an intensive study of the Flora of the Elizabeth Islands including Penikese Island, which was published in *RHODORA*, volume 32 beginning in the July issue, 1930.

Using these last surveys as a basis for comparison, ecologically the island has changed very little in the last twenty-five years. The plants constituting the Tension Line community growing between the bare beaches and the grasslands are fundamentally the same. For some unaccountable reason *Arenaria peploides* was not found after a thorough search. *Spergularia marina* was either overlooked or it too has disappeared from the island.

The grassland communities and the regions of the island they covered are unchanged as to dominant species. The asters recorded as occurring in the grasslands are missing or were overlooked because of their late summer flowering. Many of the cultivated "escapes" recorded in the last surveys have not survived. The disappearance of these and some other elements in the flora may be due to the severe drenching by salt spray in the two hurricanes that have visited this part of the New England coast in recent years. The damage done to the beech forest on neighboring Naushon Island attests to the violence of these storms.

It will be noticed that *Rhus radicans* has made its appearance in the grasslands and occurs in a number of places, but the plants

are small and stunted. The thickets of *Sambucus canadensis* have increased in size and number, particularly along the stone walls and in the depressions characteristic of glacial moraines. These depressions are filled with weedy and shrubby growth to the exclusion of the grasses. Trees and shrubs in the more exposed habitats have increased neither in number nor in size. This is apparent from the dead branches and twigs found at their tops.

The tern nesting areas on the northern slopes of the island reported in 1923 as denuded are now completely covered with a pure stand of *Rumex Acetosella*. The bird nesting sites are now scattered all over the grasslands and thus new areas are being constantly denuded. After abandonment they are first covered by a few lichens and the moss *Ceratodon purpureus*, followed by *Rumex Acetosella* and stunted *Oxalis stricta*.

Lichens occur on the scattered boulders, stone walls, rotten wood and bare soil all through the grasslands.

In the published record of the 1923 survey, the lichens were not included, but subsequently in "Notes from the Woods Hole Laboratory, 1932", Lewis and Taylor, RHODORA 35: 149-150, a list of ten lichens collected during the survey was published. In the present paper, eleven species and forms new to the island are reported, while six species collected in 1923 were not found.

The number of species of Bryophytes is reduced but among those collected there are two new records for the island.

The flora in and around the ponds has altered very little. Typha Pond has the richest and most diversified flora of the fresh water ponds. The willows that grew there have been cut and are dead. Dry Pond lived up to its name, although there was evidence of some water being present early in the year. Leper and Tern Ponds had become a mass of bare black mud by July 6th and had dried enough by the latter part of the month to enable a person to walk across them without sinking into the muck. They were surrounded by a rank growth of *Polygonum punctatum* and *Rumex maritimus*. The *Polygonum* was heavily parasitized by *Cuscuta polygonorum*. The bare mud surface had a scattered growth of very small but mature plants of *Myriophyllum pinnatum*. South Pond and Tub Point Pond were brackish with characteristic halophiles bordering them. *Ruppia*

maritima was collected in South Pond but had been reported by Dr. Jordan. The marshy area near the neck on the east shore of the main island almost duplicates the flora of Typha Pond. The bottom of the reservoirs have become filled with accumulated debris and humus which supports a rich growth of plants with *Juncus bufonius*, *Cerastium vulgatum* and *Bidens connata* as dominants.

A survey of the flora of near-by Gull Island was made in 1923, but because of government restrictions this island was not visited. It has been used as a target for bombing practice in the last few years.

The general aspect of the flora of the island has remained fundamentally the same in the last twenty-four years. There is a group of basic species that seem ecologically fitted to the peculiar environment of this windswept glacial moraine. Other species colonize for a time but some unusual conditions wipe them out. Now and again a colonist persists and thus over a long span of years the flora may change and the original climax of forest mentioned by Dr. Jordan may return. The botanists of the future should certainly watch and record the changes that may occur. On the other hand, the present aspect of the flora may be the new climax and not be replaced.

Below is a comparative summary of the results of the previous surveys.

	1873	1923	1930	1947
Species and forms of lichens	—	10	—	15 .
Species of Bryophytes	2	12	—	7
Species of Pteridophytes	1	3	3	2
Species of Spermatophytes	113	163	202	158
Total species	116	188	205	182
New records (Vascular plants)	—	94	28	29
Species missing from former surveys	—	44	22	83

Species new to the island since the 1930 report are starred.

LICHENS

(Determinations made by Dr. JOHN THOMSON, Botany Department, University of Wisconsin.)

*CLADONIA CHLOROPHAEA (Flk.) Spreng., f. SIMPLEX (Hoffm.) Arn. Bare ground in grassland.

- **C. CRISTATELLA* Tuck. (Not referable to any named form.)
Rotten wood in reservoir.
- **C. CRISTATELLA* Tuck., f. *SQUAMOSISSIMA* Robbins. Rotten
wood along stone wall.
- **C. CRISTATELLA* Tuck., f. *ABBREVIATA* Merrill. Rotten wood
along stone wall.
- C. FURCATA* (Huds.) Schrad. Bare soil in grassland.
- **C. FURCATA* (Huds.) Schrad., var. *PALAMAEA* (Ach.) Vainio, f.
SUBULATA (Ach.) Vainio. Bare soil in grassland.
- **C. NEMOXYNA* (Ach.) Nyl. On rocks, west slope.
- **C. PIEDMONTENSIS* Merrill. Bare ground in grassland.
- **C. SUBCARIOSIA* Nyl., f. *EPIPHYLLA* Robbins. Bare soil in
grassland.
- **C. SUBCARIOSIA* Nyl., f. *EVOLUTA* Vainio. Bare soil in grassland.
- **LECANORA VARIA* (Hoffm.) Ach. Rotten wood along stone wall.
PARMELIA CAPERATA (L.) Ach. On rotten wood along stone
wall. Also rocks near East cottage.
- P. SULCATA* Tayl. Bare rocks, north of East Cottage. Bare
soil in grassland, Tern nesting areas.
- **PHYSICIA MILLEGRANA* Degel. Rocks on eastern slope. Grass-
land.
- XANTHORIA PARIETINA* (L.) T. Fr. Rocks in wharf area. Also
rocks in grassland, west slope of island.

BRYOPHYTES

- **AMBLYSTEGIUM SERPENS* (Hedw.) Bry. Eur. In shallow reser-
voir, on rotting wood.
- BRYUM ARGENTEUM* (L.) Hedw. Bare spots in grassland. Not
common.
- CERATODON PURPUREUS* (Hedw.) Brid. Common all over the
island, on bare ground and at base of boulders.
- **POGONATUM PENSILVANICUM* (Hedw.) Paris. One collection,
beside rock on bare soil north of East cottage.
- POLYTRICHUM COMMUNE* Hedw. Road bank in grassland,
north of East cottage.
- P. JUNIPERINUM* Hedw. Beside boulder, in grassland. Bare
soil.
- P. PILIFERUM* Hedw. Several places on bare areas in grassland.
Growing with *Ceratodon* in one collection.

PTERIDOPHYTES

- (Determinations verified by Dr. E. T. WHERRY, University of
Pennsylvania.)
- DENNSTAEDTIA PUNCTILOBULA* (Michx.) Moore. Grassy hill-
side, n. w. of the reservoir.
 - DRYOPTERIS THELYPTERIS* (L.) Gray, var. *PUBESCENS* (Lawson)
Nakai.

(*Aspidium Thelypteris* (L.) Sw.). Tern Pond. No longer at Typha and Tub Ponds.

SPERMATOPHYTES

PINACEAE

PINUS SYLVESTRIS L. In a depression along the east shore, s. w. of the cottage. The tops badly damaged and killed by the hurricanes.

TYPHACEAE

TYPHA LATIFOLIA L. Typha Pond. No longer found at South Pond.

NAJADACEAE

RUPPIA MARITIMA L., var. (immature). In South Pond.

ZOSTERA MARINA L. Harbor in shallow water. Apparently recovering after the epidemic, but not common.

GRAMINEAE

(Determinations made by Dr. RICHARD W. POHL of Iowa State College.)

AGROPYRON REPENS (L.) Beauv. Common in grassland on Tub Point.

AGROSTIS STOLONIFERA L. Grasslands, everywhere.

A. TENUIS Sibth. (*A. capillaris* L.). Common, grasslands and tension line between beach and grasslands.

AMMOPHILA BREVLIGULATA Fernald. West slope of main island and Tub Point, elsewhere along the beaches.

*ANDROPOGON SCOPARIUS Michx. In shelter of stone wall, n. of the cottage on east shore.

ANTHOXANTHUM ODORATUM L. Common grass all over the island.

AVENA SATIVA L. Beach at s. w. corner of the main island. Rare.

*BROMUS COMMUTATUS Schrad. Grassland around the cottage on the east shore.

DACTYLIS GLOMERATA L. Grassland, chiefly on east shore and the neck.

DANTHONIA SPICATA (L.) Beauv. Grassland.

ELYMUS VIRGINICUS L. Grassland near wharf, east shore.

FESTUCA OVINA L. Grassland and tension line.

F. RUBRA L. Grassland and tension line. Also the muddy bottom of the old reservoir.

HOLCUS LANATUS L. General everywhere.

PANICUM IMPLICATUM Scribn. Sandy soil, tension line between grass and beach.

P. ORICOLA H. & C. Sandy soil, tension line.

- P. VIRGATUM L. Large clumps in grassland around Typha Pond.
- *PASPALUM CILIATIFOLIUM Michx. var. MUHLENBERGII (Nash) Fernald. Grassland, east slope near the wharf.
- PHLEUM PRATENSE L. Scattered throughout the grassland. Not common.
- POA PRATENSIS L. Common throughout grassland.
- SPARTINA ALTERNIFLORA Lois., var. PILOSA (Merrill) Fernald. Common, Tub Point.
- S. PATENS (Ait.) Muhl. Dense pure stand in marshy ground, east of Tub Point.

CYPERACEAE

- (Determinations checked by Dr. HERBERT WAHL, Pennsylvania State College.)
- CAREX LONGII Mackenzie. (*C. albolutescens* Schwein.). Commonest species. Grassland and tension line.
- *C. MUHLENBERGII Schk. Rare. Grassland, east of central ridge.
- C. SILICEA Olney. Sandy soil between beach and grassland. Not common.
- C. SPICATA Hudson. (*C. muricata* L.). Grasslands generally.
- CYPERUS FILICULMIS Vahl, var. MACILENTUS Fern. Bare hill-top, grassland north of Typha Pond.
- *ELEOCHARIS PARVULA (R. & S.) Link. Muddy border of South Pond.
- E. SMALLII Britton. (*E. palustris* (L.) R. & S.). Marshy margin of Typha Pond.
- *E. HALOPHILA Fern. & Brack. South Pond.
- SCIRPUS AMERICANUS Pers. Typha Pond and South Pond and marshy area near the Neck.
- S. PALUDOSUS A. Nelson, var. ATLANTICUS Fern. Marshy area near the Neck.
- S. VALIDUS Vahl. Marshy area near the Neck and Typha Pond.

JUNCACEAE

- JUNCUS ACUMINATUS Michx. Typha and Leper Ponds.
- *J. BUFONIUS L. South Pond and bottom of reservoir.
- *J. DICHOTOMUS Ell. Grassland, west of the reservoir.
- J. EFFUSUS L., var. COSTULATUS Fernald. Tern Pond.
- J. GERARDI Loisel. South Pond and marshy area at the Neck.
- J. TENUIS Willd. Tub and Leper Ponds and tension line between beach and grass.

LILIACEAE

- ASPARAGUS OFFICINALIS L. Depressions in grasslands, throughout the main island.

IRIDACEAE

- *IRIS GERMANICA L. Beside East cottage.
I. VERSICOLOR L. Tern and South Ponds.
SISYRINCHIUM ANGUSTIFOLIUM Mill. Tub Pond and grassy area near East cottage.

SALICACEAE

- POPULUS ALBA L. Scattered thickets on the east slope, south-west of East cottage.
P. DELTOIDES Marsh. Near the east coast, south of the wharf. Suckers from the base of the dead shrub.
SALIX ALBA \times FRAGILIS. Leper Pond, west shore. (Only the stumps left of former growth around Typha Pond.)
S. PENTANDRA L. Near old foundations, west shore. (No longer at Typha Pond.)

MYRICACEAE

- MYRICA CAROLINIENSIS Mill. Small clump, grassland near the old foundations on the west shore.

FAGACEAE

- QUERCUS RUBRA L. Grassy hillside west of East cottage.

URTICACEAE

- *MORUS ALBA L. Seven clumps on the top of the hill, Tub Point. Evidence of these plants having been killed back the previous year.

POLYGONACEAE

- POLYGONUM PUNCTATUM Ell. (*P. acre* HBK.). Common in all wet areas. Typha, South, Dry, Leper and Tern Ponds and the marshy area near the Neck.
*RHEUM RHAPONTICUM L. In the formerly cultivated area. Cottage on the East slope.
RUMEX ACETOSELLA L. Common in formerly denuded areas in grasslands. Everywhere.
R. CRISPUS L. Common in grasslands and at Typha and Leper Ponds.
R. MARITIMUS L., var. FUEGINUS (Phil.) Dusen. Margin of South and Tern Ponds and the marshy area near the Neck.

CHENOPODIACEAE

- ATRIPLEX PATULA L., var. HASTATA (L.) Gray (*A. hastata* L.). Beach areas, both sandy and cobble.
*BASSIA HIRSUTA (L.) Asch. At South and Tub Ponds. Marshy area.

CHENOPODIUM ALBUM L. Tension line between grasslands and beach. Common.

SALSOLA KALI L. Rare. Tension line between grass and beach.

PHYTOLACCACEAE

*PHYTOLACCA AMERICANA L. Rather common in grasslands in protected places, along walls, in depressions and in the old foundations.

AIZOACEAE

MOLLUGO VERTICILLATA L. Tension line in sandy soil. On the Neck.

CARYOPHYLLACEAE

CERASTIUM VULGATUM L. Weedy places in grassland. Old foundations and bottom of reservoir.

LYCHNIS ALBA L. In grassland and depressions. Common in Ammophila grassland.

SAGINA PROCUMBENS L. Tension line near the wharf.

SPERGULARIA RUBRA (L.) Presl. Tension line in the wharf area.

STELLARIA GRAMINEA L. General in grassland.

S. MEDIA (L.) Cyrill. Under the back porch of the East Cottage. Rare.

RANUNCULACEAE

RANUNCULUS ACRIS L. Locally in grassland.

R. CYMBALARIA Pursh. Abundant in the mud, South Pond. (Not found at Tern Pond.)

CRUCIFERAE

*ARMORACIA LAPATHIFOLIA Gilib. Beside shack, n. of East cottage.

*BARBAREA VULGARIS R. Br. Old foundations north of the wharf.

BRASSICA JUNCEA (L.) Cosson. Locally in grassland.

*B. KABER (DC.) Wheeler, var. PINNATIFIDA (Stokes) Wheeler. Grassland around Typha Pond.

CAKILE EDENTULA (Bigel.) Hook. Tension line on west shore and at Typha Pond.

LEPIDIUM VIRGINICUM L. Grassland. Common.

RAPHANUS RAPHANISTRUM L. Around South Pond.

SISYMBRIUM ALTISSIMUM L. East shore around cottage.

S. OFFICINALE (L.) Scop., var. LEIOCARPUM DC. Around East cottage, foundations of west cottages and the bottoms of the reservoirs.

ROSACEAE

- FRAGARIA VIRGINIANA Duchesne. Grassland on east and west slopes.
- POTENTILLA ARGENTEA L. Grassland around East cottage.
- *P. PACIFICA Howell. Gravel beach around South Pond. Very rare.
- PRUNUS SEROTINA Ehrh. Grassland n. of Typha Pond. Suckers only, 4 feet tall. Dead twigs also only that high. (Not reported from south end of island as formerly.)
- ROSA RUGOSA Thunb. Large patches in grassland, eastern shore.
- RUBUS FLAGELLARIS Willd. (*R. procumbens* Muhl.). Large areas covered in upland grassland.
- R. FRONDOSUS Bigel. Around Dry Pond. (None on Tub Point as in the last survey.)
- R. LACINIATUS Willd. Large thickets in hollow west of the Reservoir. (None on Tub Point as previously.)

LEGUMINOSAE

- LATHYRUS JAPONICUS Willd. var. GLABER (Ser.) Fern. (*L. maritimus* Bigel.). Rare. Gravel beach around South Pond.
- TRIFOLIUM HYBRIDUM L. Grassland near Tern Pond. Rare.
- T. PRATENSE L. Grassland. Not common.
- T. REPENS L. Grassland. East slope. Not common.
- *Vicia ANGUSTIFOLIA Reichard. Grassland around East cottage.
- V. TETRASPERMA (L.) Moench. Edge of grass and depression in cliffs, near Typha Pond.

OXALIDACEAE

- OXALIS STRICTA L. Common in grasslands.

EUPHORBIACEAE

- EUPHORBIA POLYGONIFOLIA L. Sandy area on the Neck.
- E. SUPINA Raf. Sandy area around east shore and the wharf.

CALLITRICHACEAE

- CALLITRICHE HETEROPHYLLA Pursh. Mud of Typha Pond.

ANACARDIACEAE

- *RHUS COPALLINA L., var. LATIFOLIA Engler. Edge of grassland and beach, just s. of wharf.
- R. RADICANS L. Occasionally on grasslands. Not common.
- R. TYPHINA Torner. Hillside area near the East cottage. With pines and maples.

VITACEAE

- PARTHENOCISSUS QUINQUEFOLIA (L.) Planch. (*Psedera quinquefolia* (L.) Greene.). Over a shed, area near East cottage.
P. TRICUSPIDATA (Sieb. & Zucc.) Planch. Shed in hillside near the pines and maples. East cottage.

ACERACEAE

- ACER PSEUDOPLATANUS L. Southwest of East Cottage. Grove badly damaged by hurricanes.

HYPERICACEAE

- HYPERICUM MUTILUM L. Typha and Leper Ponds.
H. PERFORATUM L. Grasslands at East cottage and Tub Point.

ONAGRACEAE

- LUDWIGIA PALUSTRIS (L.) Ell., var. AMERICANA (DC.) Fern. & Grise. (*Isnardia palustris* L.). Mud of Typha Pond.
OENOTHERA BIENNIS L. Grassland in vicinity of the Neck.

HALORAGIDACEAE

- MYRIOPHYLLUM PINNATUM (Walt.) BSP. (*M. scabratum* Michx.). Shallow water and mud of Typha and Leper Ponds.

UMBELLIFEREAE

- DAUCUS CAROTA L. Grasslands, everywhere.
LIGUSTICUM SCOTHICUM L. Tension line. Not common.

ERICACEAE

- (Determinations verified by Dr. E. T. WHERRY, University of Pennsylvania.)
*KALMIA ANGUSTIFOLIA L. One colony in grassland.
*VACCINIUM ATROCOCUM (Gray) Heller. Rare. Grassland, central part of main island.

PRIMULACEAE

- ANAGALLIS ARVENSIS L. Common. Grasslands and beaches.

OLEACEAE

- LIGUSTRUM VULGARE L. Near cottage on East shore and the foundations on west shore. The tops of the bushes have been killed.

CONVOLVULACEAE

- *CONVOLVULUS SEPIUM L., var. COMMUNIS Tryon (*C. sepium* L.). Base of grassy hillside, Tub Point.

C. SEPIUM L., var. AMERICANUS Sims (*C. sepium* L., var. *pubescens* (Gray) Fern.). Grassland along west coast. Marshy area at the Neck and South Pond.

*CUSCUTA POLYGONORUM Englm. Dry Pond. On *Polygonum punctatum* Ell. Identified by Dr. Truman Yuncker.

LABIATAE

GLECHOMA HEDERACEA (L.) Trevisan. In *Ammophila* grassland, n. of East cottage.

LEONURUS CARDIACA L. Edge of grassland and beach, east side of the island.

LYCOPUS UNIFLORUS Michx. Typha and Leper ponds.

*MENTHA ARVENSIS L. Marshy area at the Neck.

NEPETA CATARIA L. Grassland, east slope. Also in a mass of dead eel-grass.

SCUTELLARIA GALERICULATA L. (*S. epilobiifolia* Hamilton). Typha Pond margin.

TEUCRIUM CANADENSE L. (var. LITTORALE (Bickn.) Fern.). Grassland generally, in *Ammophila* area on west shore. Marsh area at the Neck and the border of South Pond.

SOLANACEAE

DATURA STRAMONIUM L. Tension line between beach and grass, area from wharf to East cottage.

SOLANUM NIGRUM L. Common in grassland all over the island.

SCROPHULARIACEAE

*LIMOSELLA SUBULATA Ives. Mud of Typha Pond. (Det. checked by Dr. F. W. Pennell.)

LINARIA CANADENSIS (L.) Dumont. Tension line around the island.

LINDERNIA ANAGALLIDEA (Michx.) Pennell (*Ilysanthes inaequalis* (Walt.) Pennell). Mud of Typha Pond, under the grass or the sedge. (Det. by Dr. F. W. Pennell.)

VERBASCUM THAPSUS L. Locally in grasslands.

PLANTAGINACEAE

PLANTAGO LANCEOLATA L. Grasslands from the beaches to hilltop.

P. MAJOR L. Marshy area at the Neck and Typha Pond.

RUBIACEAE

GALIUM TINCTORIUM L. (*G. Claytoni* Michx.). Leper, South and Typha Ponds. (*G. trifidum* of 1923 survey changed by Dr. J. M. Fogg, Jr. to this species on sheet in University of Pennsylvania Herbarium.)

CAPRIFOLIACEAE

LONICERA JAPONICA Thunb. Near cottage foundations on the west slope. Small patches.

SAMBUCUS CANADENSIS L. Common. Large thickets in depressions in grasslands and along stone walls.

CAMPANULACEAE

*TRIODANIS PERFOLIATA (L.) Nieuw. (*Specularia perfoliata* (L.) A. DC.). Tension line. Rare.

COMPOSITAE

ACHILLEA MILLEFOLIUM L. Tension line and grasslands. Common.

*A. MILLEFOLIUM L. forma ROSEA Rand & Redfield. Grassland beside the East cottage.

AMBROSIA ARTEMISIIFOLIA L. Tension line, the Neck and Tub Point.

BIDENS CONNATA Muhl. Marshy area near the Neck, Typha Pond and bottom of reservoir.

CHRYSANthemum LEUCANTHEMUM L., var. PINNATIFIDUM Lecoq & Lamotte. Grasslands. Common.

CIRSIIUM ARVENSE (L.) Scop. Locally in grass and tension line.

C. VULGARE (Savi) Tenore (*C. lanceolatum* (L.) Hill.). Grasslands throughout, not common.

COREOPSIS LANCEOLATA L. Near the foundations on west shore. Rare.

ERECHTITES HIERACIFOLIA (L.) Raf. Common in marshy area near the Neck.

ERIGERON CANADENSIS L. (*Leptilon canadense* (L.) Britton). Grasslands and tension line, mainly on Tub Point.

E. PUSILLUS Nutt. (*Leptilon pusillum* (Nutt.) Britton). In weedy patches in grasslands and along tension line.

*E. STRIGOSUS Muhl. Grassland, depression on hilltop of Tub Point.

GNAPHALIUM OBTUSIFOLIUM L. (*G. polycephalum* Michx.). Common all along shore and in grasslands.

*SOLIDAGO GRAMINIFOLIA (L.) Salisb., var. NUTTALLII (Greene) Fernald. Grassland, west slope and south-east of reservoir. Not common.

S. RUGOSA Mill. Grasslands. Common.

S. SEMPERVIRENS L. Common in grasslands and tension line above beaches.

S. TENUIFOLIA Pursh. (*Euthamia tenuifolia* (Pursh) Greene). Grassland around reservoir.

SONCHUS ASPER (L.) Hill. Common generally over the island. Grasslands and tension line.

S. OLERACEUS L. Gravel bar, east side of South Pond.

The following plants have been collected on Penikese Island in the past, but were not found in 1947. They have been recorded in Dr. John M. Fogg's study of the Flora of the Elizabeth Islands.

PTERIDOPHYTES

ATHYRIUM FILIX-FEMINA (L.) Bernh., var. MICHAUXII (Spreng.) Farwell.

SPERMATOPHYTES

GRAMINEAE

AGROSTIS STOLONIFERA L., var. COMPACTA Hartm.

BROMUS SECALINUS L.

B. HORDEACEUS L.

DIGITARIA SANGUINALIS (L.) Scop. Jordan's List.

DISTICHLIS SPICATA (L.) Greene.

ECHINOCHLOA CRUSGALLI (L.) Beauv.

FESTUCA ELATIOR L.

PANICUM MERIDIONALE Ashe.

POA ANNUA L.

SETARIA VIRIDIS (L.) Beauv. Jordan's List.

CYPERACEAE

CAREX HORMATHODES Fernald.

C. SCOPARIA Schkuhr.

ELEOCHARIS ACICULARIS (L.) R. & S.

E. OBTUSA (Willd.) Schultes.

JUNCACEAE

JUNCUS ARTICULATUS L. (Reported as *J. debilis* Gray in RHODORA 26: 223, 1924.)

J. GREENEI Oakes & Tuckerm.

J. PELOCARPUS Mey. Jordan's list.

LILIACEAE

LILIUM TIGRINUM Ker.

SMILAX ROTUNDIFOLIA L.

IRIDACEAE

SISYRINCHIUM ATLANTICUM Bickn.

S. MONTANUM Greene (*S. angustifolium* of authors, not Mill.).

SALICACEAE

SALIX DISCOLOR Muhl. Jordan's List.

BETULACEAE

BETULA POPULIFOLIA Marsh. Jordan's List.

POLYGONACEAE

POLYGONUM AVICULARE L.

P. CONVULVULUS L.

P. PERSICARIA L.

RUMEX OBTUSIFOLIUS L. Jordan's List.

CHENOPODIACEAE

ATRIPLEX ARENARIA Nutt. Jordan's List.

SALICORNIA EUROPAEA L. Jordan's List.

SUAEDA MARITIMA (L.) Dumort. Jordan's List.

AMARANTHACEAE

AMARANTHUS RETROFLEXUS L.

CARYOPHYLLACEAE

ARENARIA PEPLOIDES L., var. ROBUSTA Fernald.

DIANTHUS BARBATUS L.

GYPSOPHILA PANICULATA L.

SPERGULA ARVENSIS L. Jordan's List.

SPERGULARIA LEIOSPERMA (Kindb.) F. Schmidt.

PORTULACACEAE

PORTULACA OLERACEA L.

RANUNCULACEAE

RANUNCULUS FLABELLARIUS Raf. (*R. delphinifolius* Torr.)

CRUCIFERAE

BRASSICA NIGRA L.

CAPSELLA BURSA-PASTORIS (L.) Medic.

RAPHANUS SATIVUS L.

ROSACEAE

AMELANCHIER OBLONGIFOLIA (T. & G.) Roem.

FRAGARIA VESCA L. Jordan's List.

POTENTILLA NORVEGICA L., var. HIRSUTA (Michx.) Lehm.

P. CANADENSIS L. (*P. pumila* Poir.)

ROSA PALUSTRIS Marsh.

RUBUS CANADENSIS var. PERGRATUS (Blanch.) Bailey. (*R. pergratus* Blanch.)

LEGUMINOSAE

TRIFOLIUM AGRARIUM L.

T. ARVENSE L.

VICIA CRACCA L.

GERANIACEAE

GERANIUM CAROLINIANUM L.

ACERACEAE

ACER PLATANOIDES L.

MALVACEAE

MALVA NEGLECTA Wallr. (*M. rotundifolia* L.)

VIOLACEAE

VIOLA FIMBRIATULA Sm.

ONAGRACEAE

OENOTHERA GRANDIFLORA Ait.

UMBELLIFERAE

COELOPLEURUM LUCIDUM (L.) Fernald. Jordan's List.

ASCLEPIADACEAE

ASCLEPIAS INCARNATA L., var. PULCHRA (Ehrh.) Pers.
A. SYRIACA L.

CONVOLVULACEAE

CONVOLVULUS ARVENSIS L.

LABIATAE

LYCOPUS AMERICANUS Muhl.

SOLANACEAE

SOLANUM ROSTRATUM Dunal. Collected by Hollick.

SCROPHULARIACEAE

DIGITALIS PURPUREA L.
LINARIA VULGARIS Hill.

PLANTAGINACEAE

PLANTAGO MAJOR L., var. INTERMEDIA (Gilibert) Dcne.

CUCURBITACEAE

CUCURBITA MAXIMA Duchesne.

COMPOSITAE

ASTER ERICOIDES L. (*A. multiflorus* Ait.)

A. UNDULATUS L.

A. VIMINEUS Lam.

ANTHEMIS COTULA L.

GNAPHALIUM ULIGINOSUM L.

HELIANTHUS ANNUUS L.

IVA ORARIA Bartlett.

LEONTODON AUTUMNALIS L., var. PRATENSIS Koch.

RUDBECKIA HIRTA L.

SOLIDAGO CANADENSIS L.

S. JUNCEA Ait.
S. NEMORALIS Ait.
SONCHUS ARVENSIS L.
TANACETUM VULGARE L.
TARAXACUM OFFICINALE Weber.
XANTHIUM ECHINATUM Murr.

UNIVERSITY OF PENNSYLVANIA

POTAMOGETON BICUPULATUS IN MASSACHUSETTS.—During the summer of 1947, as complete a collection as possible was made of the vascular plants of the township of Petersham, northwestern Worcester County, Massachusetts. Upon identification, one of the pondweeds was found to be *Potamogeton bicupulatus* Fernald.

The species was first described by Dr. M. L. Fernald (*The Linear-leaved North American Species of Potamogeton*) from material taken in the mountains of Pennsylvania and Tennessee. The type-specimen was collected by Garber in Lehigh County, Pennsylvania in 1866. There is one record of the plant taken in Lake Dunmore, Vermont, which has never been corroborated.

The specimens from Petersham were taken from Harvard Pond (formerly Meadow Water Pond), an artificial pond created many years ago to operate a mill with the run-off from Tom Swamp. It is nowhere very deep and an abundant growth of all types of aquatic vegetation almost obscures the pond toward its margin. *P. bicupulatus* was found on the low mud-flats exposed by the low water of the pond. Probably in a summer of more abundant rainfall, these would not be exposed. Accompanying the *Potamogeton* were *Myriophyllum humile* (Raf.) Morong. and *Utricularia gibba* L.—C. EARLE SMITH Jr., Harvard University.

FORMS OF CORNUS CANADENSIS IN MINNESOTA.—Field observations attendant to collecting, supported by a study of herbarium specimens, warrant the segregation of Minnesota material of *Cornus canadensis* L. into a few ecological variants, differing vegetatively from the typical form conceived as plants with simple stems with apparent apical whorls of leaves.

CORNUS CANADENSIS L. f. RAMOSA Lepage is characterized by the development of leafy branches either in the axils of the leaves

constituting the normal whorl, or below the whorl. The following collections are referable to this form: high and heavily glaciated granite ridge near Bass Lake, north of Ely, St. Louis Co., Aug. 30, 1936, *J. B. Moyle*, no. 2394, reported in *RHODORA* **40**: 276, 1938, as *Cornus suecica* L., which does not occur in the state; talus-slope of Mt. Mary, Ilgen City, Lake Co., Sept. 16, 1945, *Lakela* no. 6242; jack pine forest, 6 miles south of Gilbert, St. Louis Co., June 25, 1939, *Lakela* no. 3045; mixed forest on 60-acre island, Island Lake, 20 miles north of Duluth, June 16, 1944, *Lakela* no. 5536; sandy ridge south of Lake Itasca, July 9, 1928, *C. O. Rosendahl* no. 5648; Bowstring, Itasca Co., July 1925, *H. E. Stork* no. 1101, one plant on the sheet with the typical form; exposed outcrop northeast of Palmers, St. Louis Co., July 20, 1947, *Lakela* 6933a.

CORNUS CANADENSIS L. f. *MEDEOLOIDES* Lepage was based on plants with two successive whorls of leaves, the uppermost developing by extension of the stem above the normal verticil, in contrast to Lepage's f. *infraverticillata* in which the additional verticil of leaves replaces the bracts below the normal leaves. The following collections are referred to the former category: bog-forest, north end of Decodon Pond, Anoka Co., Aug. 2, 1933, *M. F. and H. F. Buell* no. 672; T. 65, R. 19, St. Louis Co., Sept. 16, 1936, *W. Webb*; tamarack swamp, Hennepin Co., May 1891, *F. H. Burglehaus* (one double verticillate plant with four typical). Inconsistent with this concept is the following collection: west-facing slope of the Great Laurentian Highland Divide, $\frac{1}{2}$ mi. east of Highway 53, St. Louis Co., *John W. and Marjorie F. Moore* no. 10339, two double-verticillate plants arising from the common rootstock with the typical plants.

A variant bearing more than one inflorescence per erect stem appears to be undescribed. Growing with the typical form were found plants which bear above the normal verticil of leaves two to three peduncles with inflorescences, cymose-fashion, the central one more mature than the lateral ones. Sometimes the lateral peduncles are twice as long as the central one, six to three centimeters, respectively. One of the flowering peduncles may be aborted or replaced by a leafy branch. Some plants bear leafy branches below the normal whorl of leaves, reminiscent of f.

ramosa which was not based on plants with multiple peduncles. The variant is herewith described as

Cornus canadensis L., f. **florulenta**, f. nov., differt a f. *typica* 2-3 pedunculis floriferis vel ramulis foliosis super foliorum verticillum gestis. TYPE: *Lakela* no. 6933, July 20, 1947, growing in moss- and lichen-mats on flat rocks within the railroad right-of-way 1 mi. northeast of Palmers, St. Louis Co., Minn. (Univ. of Minn. Herb. Minneapolis).

The form differs from the typical form by the development of two to three inflorescences on distinct peduncles in axils of leaves constituting the usual whorl. The collection of Dr. Thomas S. Roberts, Aug. 6, 1879, Poplar River, Cook Co., Minn., (Univ. Minn. Herb. Mpls.) is referred to this form.—OLGA LAKELA, University of Minnesota, Duluth Branch.

Volume 50, no. 599, consisting of pages 253-284 and plate 1118, was issued 5 November, 1948.

ERRATA

Page 17, line 23; for *Basiliensis* read *Brasiliensis*.

Page 17, line 30; for *Shortiana* read *Shortii*.

No. 590, Contents, line 9; for *Lampylum* read *Campylum*.

Page 63, line 11; for *CARUNCULATA* read **carunculata**.

Page 166, line 15; for *sugbenus* read *subgenus*.

No. 599, Contents, line 4; for 270 read 269.

No. 599, Contents, line 6; for 279 read 280.

No. 599, Contents, line 9; for 283 read 284.

Page 276, line 32; delete (Fig. 1).

Page 276, line 33; delete (Fig. 2).

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